MINNESOTA PAINT & POWDER EXPO

Moving Parts Through the Process

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Midwest Finishing Systems, Inc
MATERIAL HANDLING CONSIDERATIONS

DESIGN DATA

• Product Size
• Product Weight
• Production Requirements
• Maneuverability
MATERIAL HANDLING CONSIDERATIONS

PRODUCT SIZE

• Width x Height x Length
• This creates the window of opportunity
MATERIAL HANDLING CONSIDERATIONS

SUBSTRATE MATERIAL
- Steel (CRS or HRS)
- Aluminum
- Castings
- Thickest Material
- Maximum Weight
MATERIAL HANDLING CONSIDERATIONS

PRODUCTION REQUIREMENTS

• Yearly (260 days)
• Monthly
• Daily

Production requirements will dictate the process

• Manual Process
• Automated Process

• Area Available
TYPES OF CONVEYING METHODS

CARTS – Batch Type Systems
- Heavy Parts or Light Parts – Low Volume

MONORAIL – Batch Type Systems
- Heavy Parts or Light Parts – Low Volume

CONTINUOUS POWERED – High Volume Throughput
- Heavy Parts or Light Parts
- Constant Speed Through the Processes

POWER & FREE – High Volume Throughput
- Heavy Parts or Light Parts
- Material Handling - Delivery
CONVEYING METHODS

BATCH TYPE SYSTEMS

• Cycle times in each stage
  o Size the equipment to avoid bottlenecks
  o Doors on one or both sides
  o Separate drying (if possible)

• Adequate Space
  o Room to load/unload & move

• Design of carts/racks
  o Good density
  o Profile parts for cleaning and coating
  o Parts must not hit one another (through the process)
CONVEYING METHODS
CONVEYING METHODS
CONVEYING METHODS
## CONVEYING METHODS

### CONVEYOR SELECTION

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ENCLOSED</th>
<th>3” I-BEAM</th>
<th>4” I-BEAM</th>
<th>6” I-BEAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Point Capacity</td>
<td>75#</td>
<td>200#</td>
<td>400#</td>
<td>1,200 #</td>
</tr>
<tr>
<td>Capacity w/Load Bar</td>
<td>150#</td>
<td>400#</td>
<td>800#</td>
<td>2,400#</td>
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</tbody>
</table>
CONVEYING METHODS

Calculating Design Line Speed – Feet Per Minute (FPM)

• Product (Yearly) = 234,000
• Product Size = 2’ wide x 4’ high x 3’ long

234,000 product per year / 260 working days = 900 per day / 7.5 working hours = 120 per hour

120 per hour x 4’ hanging centers = 480’ conveyor length / 60 minutes in hour = 8 FPM
CONVEYING METHODS

LINE SPEED = 8 FPM
CONVEYOR = 4" I-BEAM
TOTAL CONVEYOR = 997"
PART OPENING = 48" W 84" H
LONGEST PART = 120"
PARTS HUNG ON 72" CENTERS

FIVE STAGE WASHER
ZONE 1 = 90 SEC.
ZONE 2 = 30 SEC.
ZONE 3 = 45 SEC.
ZONE 4 = 30 SEC.
ZONE 5 = 30 SEC.

8 MIN. DRY-OFF OVEN
25 MIN. CURE OVEN
CONVEYING METHODS

LINE SPEED = 6 FPM
CONVEYOR = ENCLOSED TRACK
TOTAL CONVEYOR = 768'
PART OPENING = 24" W 72" H
LONGEST PART = 170'
PARTS HUNG ON 96" CENTERS

FOUR STAGE WASHER
ZONE 1 = 90 SEC.
ZONE 2 = 40 SEC.
ZONE 3 = 30 SEC.
ZONE 4 = 30 SEC.

8 MIN. DRY-OFF OVEN
20 MIN. CURE OVEN
POWER & FREE CONVEYOR
CONVEYING METHODS

LINE SPEED = 20 FPM
CONVEYOR = POWER AND FREE
PART OPENING = 36" W 126" H
LONGEST PART = 90"
PARTS HUNG ON ENDS

FIVE STAGE WASHER
ZONE 1 = 77 SEC.
ZONE 2 = 47 SEC.
ZONE 3 = 77 SEC.
ZONE 4 = 34 SEC.
ZONE 5 = 34 SEC. W/HALO

15 MIN. DRY-OFF OVEN
7.5 MIN. COOLING TUNNEL
30 MIN. CURE OVEN
8 MIN. COOLING TUNNEL
17,870 SQ. FT. REQUIRED
QUESTIONS?
THANK YOU

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POWDERCOATING.com

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